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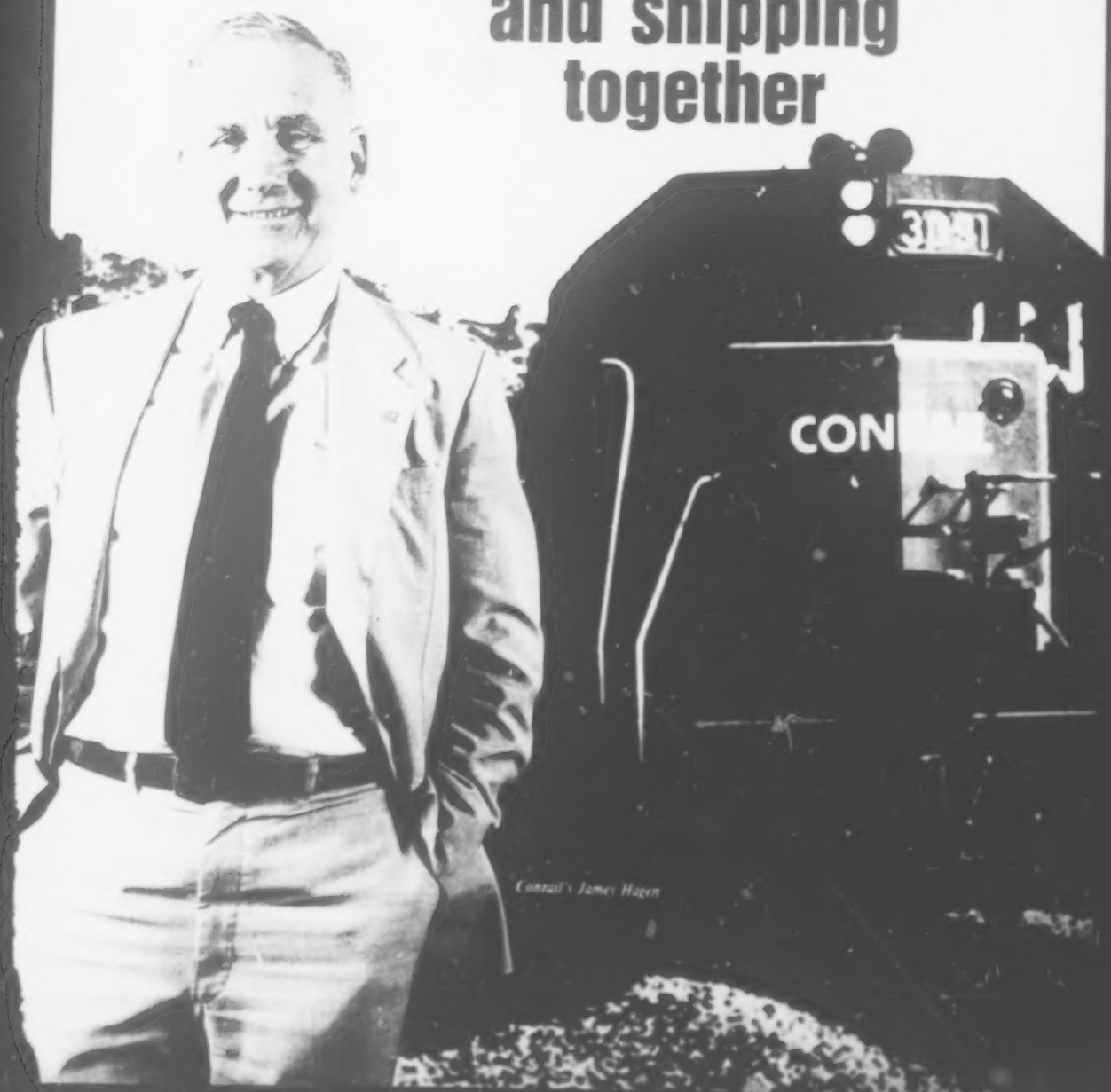
JIT: problems and solutions • EDI: the electronic handshake
• Put the sales pitch in the contract • Readers respond on ethics

Purchasing

THE BUYER'S MAGAZINE

MARCH 1990

In transportation: Putting partnering and shipping together



Conrail's James Hagen

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PurchasingWorld

PW POINTERS

Correction: Electronic Data Systems corporation was incorrectly identified as Anacomp in the March issue's "Guide to Software Solutions." EDS offers Purchasing Decision Support (PDS) software to strategically automate purchasing functions in multi-location corporations. *Electronic Data Systems Corp., 20325 Center Ridge Rd., Suite 225, Rocky River, OH 44116*
Circle 2

Ameritech guide aids buyers

Buyers and sellers of industrial products and services can now take advantage of the 1990 Ameritech Industrial Purchasing Guide (formerly the Ameritech Industrial Yellow Pages). A card accompanying the guide directs the book to the purchasing department of the business and insures authenticity. The directory has two sections: alphabetical white pages and the products and services yellow pages containing over 4,500 headings. It is published in 13 regional editions.

Company sensitive to environmental woes

Dow Chemical Company is taking action in the struggle for a clean and healthful environment. The company is phasing out the use of blowing agents containing fully halogenated chlorofluorcarbons (CFCs) in the production of a polystrene foam loose-fill packaging material. The company is experiencing a 98.5% reduction in ozone depletion potential compared to the previous blowing agent, with virtually no loss of performance.

Transport company plans drug tests

CSX Transportation Inc. has announced plans to begin random drug testing of its employees covered by the Hours of Service Act, as well as managers who supervise personnel in those safety-related positions. CSX was one of the first companies in the industry to start employee assistance programs aimed at the treatment of drug and alcohol abuse.

Bulletin stresses savings beyond a bid

Titled "Don't Pay A High Price For A Low Bid," the bulletin emphasizes the savings that can go far beyond a low bid. The four-page bulletin describes the many ways that an extruder can help a company to hold down costs while improving product quality and profits. Topics discussed include: lower production and assembly costs; reduced capital expenditures; smoother production flow; smaller inventories; greater product durability, performance and customer appeal. *R.D. Werner Co., Inc., Mill Products Division, P.O. Box 580, Greenville, PA 16125*

Video shows how a quality award is won

The Association for Manufacturing Excellence has produced an educational video story of how total company dedication to key quality initiatives achieved the Malcolm Baldrige National Quality Award for major manufacturing companies. It outlines the corporate goal of "total customer satisfaction" and attaining key initiatives of total cycle time reduction, product and manufacturing leadership, product improvement, participative management within and cooperation between organizations.

Video shows how excellence was achieved through leadership, information and analysis planning, human resource utilization, quality assurance results, and customer satisfaction. *AME 380 W. Palatine Rd., Wheeling, IL 60090*

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PW PREDICTS

Demand holds prices in check

A lackluster demand pattern in early 1990 would seem to assure continuing near-term price restraint. Indeed, a fair number of industrial price tags have actually eased.

If there is any doubt on this score, take a look at some of the nation's leading price indexes—starting first with the NAPM Business Survey Committee yardstick which compares the number of members reporting increases with the number noting reductions. It shows price declines predominating for the eighth consecutive month.

The gap has narrowed a bit, but the NAPM group's chairman Bob Bretz feels a good number of the recent increases are little more than aftermath of recent cold weather, rather than a reflection of any underlying upward pressure. Moreover, should declines continue to top increases over the next few months, it would be especially significant. That's because March and April have been popular months for boosting industrial prices.

Also indicative of a buyer's market is the continuing softness in sensitive raw material quotes. This grass roots indicator of inflationary pressures is now running a significant 10% under the peaks of early last year. And, as suggested elsewhere in this section, such key commodity lines as steel, nonferrous metals, and plastic resins all are shaky, and in some cases edging lower.

The upward tug on more highly fabricated goods also seems to be minimal. Thus, a new Commerce Department projection sees capital goods tags rising only 1.4% in 1990. That's actually down a bit from last year's already-low 1.8% advance.

Also, don't forget Uncle Sam's all-inclusive industrial producer price barometer. This bellwether inflation standard is running less than four percent ahead of a year ago. More important, most forecasts point to continued restraint here. Wharton Econometrics, for example, is calling for a relatively level second and third quarter—with the year as a whole up about 2.4%.

It should also be pointed out that demand and supply aren't the only factors working to keep a lid on inflation. For one, there are import prices. Import quotes (except fuel) over the past year have held virtually unchanged. Other things being equal, this makes it a lot harder for domestic producers to post new increases.

And don't forget the Fed; latest pronouncements from the nation's top money managers indicate they're not about to ease the monetary brakes. This means less-than-otherwise-might-be-expected demand for houses, cars, and even capital equipment—and, as such, should put an additional lid on any new price increases.

Then there are energy tags; prices were driven up by frigid early winter weather, but the worst is over. Ample crude oil supplies should hold first quarter 1990 refiner acquisition costs to about $18/barrel (about $1 under fourth quarter 1989 levels). And for all of the new year, these costs should average out in the even lower $16-17/barrel range.

There are still some trouble spots. In the service sector, for example, employer health insurance tabs could be up another 15% or so. But even in services there are some offsets—with Wharton and *PW* readers agreeing that transportation costs will rise only 3-3.5% this year.

Finally, even the normally faster-rising cost-of-living index seems to be under control. New forecasts by three independent sources (the Bush Administration, the Congressional Budget office, and Blue Chip Economic Services) put the 1990 increase in the 4.1-4.2% range (fourth quarter 1989 to fourth quarter 1990)—down from last year's 4.7% advance.

Plastic buyers call tune

CURRENT SITUATION: Buyers have been calling most of the signals lately in the plastic resins market, forcing double-digit price declines over the past year in such workhorse commodities as polyethylene (PE), polyvinyl chloride (PVC), polypropylene (PP), and polystyrene (PS). Even the sluggish government price index, which often fails to pick up all the discounting, is off 11% over the same period.

DEMAND: Current lackluster performance should continue through the year—with totals doing little more than equalling 1989 levels. Indeed, actual declines are possible in construction-dependent PVC and appliance-oriented ABS. On the other hand, both high density polyethylene (HDPE) and low density (LDPE) could eke out small advances.

SUPPLY: New facilities coming onstream will intensify an already oversupplied market. Another 7% increase in thermoplastic resin potential, for example, is expected this year—enough to drop the overall operating rate here down to 79%. That's a far cry from the 90%-plus readings of 1987 and 1988. Only HDPE will be able to maintain a 90% pace—with other rates falling to these levels: ABS (73%), LDPE (81%), PP (73%), PS and PVC (76%).

PRICE OUTLOOK: The combination of a supply glut and so-so demand suggests a basically soft picture. But it would be unrealistic to expect a repeat of last year's sharp declines—not with feedstock costs continuing to hold relatively steady. Best bet: only fractional declines through summer. But because prices were so strong in early 1989, the year as a whole is likely to be down by as much as 10%. And even in 1991 (when demand is expected to be somewhat brisker) price advances will be limited.

Air freight demand to rise

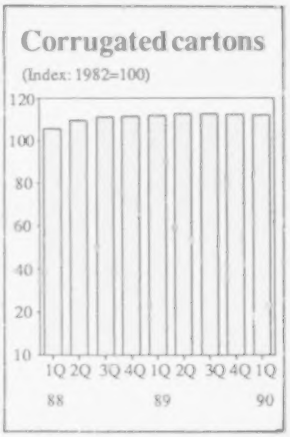
Demand could be up as much as 12-13% if business picks up later this year. But even if it doesn't, tonnage should equal 1989 levels. So predicts Right-O-Way, a CA-based multi-modal company. The firm also sees a shift in the ratio of overnight *versus* deferred delivery for a heavyweight cargo (now about 50/50). Emphasis should be toward later shipment. Reasons: 1) reluctance to pay premium costs of overnight delivery in a soft economy, 2) more precise time-definite deliveries for slower shipments, and 3) growing EDI sophistication.

Price erosion in foam feeds

Slow auto and housing markets are taking their toll on toluene diisocyanate, the key urethane feedstock. Minor price erosion is already cropping up, with transaction prices off about 2-4¢/lb. from the $1/lb. transaction level (large buyers) of last summer. Demand isn't too strong, either, with totals expected to do little more than match last year's results. It would, however, be unrealistic to expect much more of a decline inasmuch as 1) expansion plans are being stretched out and 2) toluene input costs remain high.

Paper prices show weakness

Overcapacity and slower demand are weakening prices in most sectors. Unbleached kraft linerboard has slipped to as low as $385/ton, some $25/ton under list. This, in turn, is putting new downward pressure on corrugated cartons. Also soft are 1) market pulp, where substantial discounts are noted for Southern hardwood and softwood grades, and 2) uncoated white papers, where discounting has again broken out after a January hike failed to hold. Bucking the trend: coated boxboard, which recently advanced some $35/ton.



Commodity resin bottoms out

Polyvinyl chloride seems to be bottoming out after a decline that sent prices down 13.5¢/lb. (to 30.5¢). Sign of the times: new producer announcements aimed at tacking 2¢/lb. onto the going quote. Reasons given: a modest pickup in demand—plus the fact that the feedstock (vinyl chloride monomer) has dropped less than the resin over the past year. But whether the new boost will hold up over the longer pull is problematical, since the industry as a whole is expected to run at only 76% of potential during the current year.

Weak steel mart

CURRENT SITUATION: The market has been weakening—reflecting reduced activity in both the auto and construction sectors. **As might be expected, prices have turned a bit softer**—with the composite quote now under $520/ton—some $20 under recent peaks. Plenty of discounting, too. Thus, the average sheet quote is being shaded anywhere from $50-100/ton, compared to the $35-75/ton discounts of late 1989.

DEMAND: Some tonnage decline is all but certain, with estimated 1990 domestic shipments put in the 77-79 million-ton range (compared to 83 million last year). But that still will leave totals well above 1982-86 depressed levels. Factors behind the current slowdown include a 2-3 million-ton drop-off in consumption, modest trade deterioration after 1989's improvement, and inventory retrenchment (estimated at near one million tons this year).

SUPPLY: No major problems are anticipated. Surveyed buyers voice few worries and actually expect improved delivery performance in the months immediately ahead. Also indicative of an easier market: **operating rates are now hovering around the 80% level**—well under the near-90% readings of just a year ago. Then, too, the big capacity rationalizations of the past decade are over. Last year, for example, steelmaking potential actually edged up by more than three million tons (to 115.4 million). And it's expected to stay there this year. **Finally, there are increasing imports**—expected to rise some 1.5 million tons this year (to near 19.5 million).

PRICE OUTLOOK: Current softness should persist—with further slight erosion possible. All told, the average 1990 steel price (*vis a vis* all of 1989) should be down about 2%. Indeed, there are already signs of this—witness the bigger discounts cited above. The recent decline in alloys (most notably nickel and vanadium) should also keep tags under pressure. **Looking further ahead—moderation should persist into 1991, when about a 3% advance is projected.**

Aluminum tags still softening

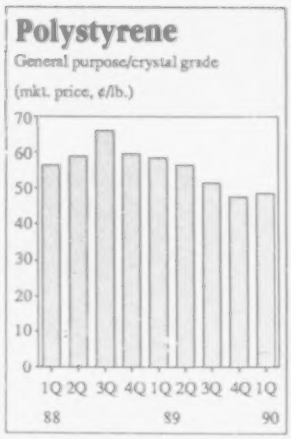
Prices continue to soften with transaction quotes on primary ingot dropping to as low as 65¢/lb. Fabricated items are also down as producers post as many as seven 5% discounts on many flat-rolled products. Can stock is also moving as much as 6¢/lb. under list. Behind the slippage: weak demand, increasing supplies and easiness in hedge markets. Also calculated to keep a lid on prices: the considerable amount of new capacity coming onstream this year—at a time when demand is expected to rise by only about 1.5%.

Zinc drops from peak

The alloying and plating metal now commands only 65¢/lb.—a drop of 30¢/lb. from the peaks of less than a year ago. Behind the latest decline: settlement of a Peruvian strike, falling London Metal Exchange quotes, and less-than-sensational demand. Nor is any turnaround expected; quite the contrary, further softness is possible as supplies continue to increase at a time when Western-world consumption remains relatively unchanged at around 5.37 million metric tons. Moreover, zero in on the U.S., and a 2% decline in usage is possible.

Styrene prices, demand rise

Prices are scheduled to move up 3¢/lb. this month. Blame it on a combination of rising styrene feedstock costs and a modest demand pickup. If the boost holds, transaction prices on volume purchases of the general purpose/crystal grade could edge up close to the 50¢/lb. level. That's still far under the 59¢/lb. high of early last year. Moreover, any further increase seems highly unlikely as another 6% boost in production potential comes onstream this year—all at a time when demand is expected to remain relatively unchanged.



Transport costs are mixed

Many of the early January fuel-related trucker increases (some of them ranging upward of 5%) are being either watered down or eliminated. Reason: the sharp drop in diesel fuel costs over the past month or so. Developments in other transportation areas include 1) a 50¢ boost in UPS overnight package rates (though high-volume customers can still get quotes as low as $7/package), and 2) westbound transatlantic ship rates are targeted for the following April 1 advances: $150 per 20-foot container and $225 per 40-foot container.

Rubber loses some bounce

Good news for buyers of industrial rubber products: price increases, which averaged out near 4.1% over the past decade, are expected to show a more modest 2.6% annual rate of advance over the next few years.

This upbeat projection, part of a new Freedonia Group study of this $7 billion industry, is attributed to international competition. Specifically, the Cleveland-based research firm sees foreign sellers continuing to hold onto labor capital, and governmental assistance advantages—thus inhibiting price boosts by domestic producers. Inroads by plastic materials, adds the Freedonia study, could also be a price rise inhibitor in some product lines.

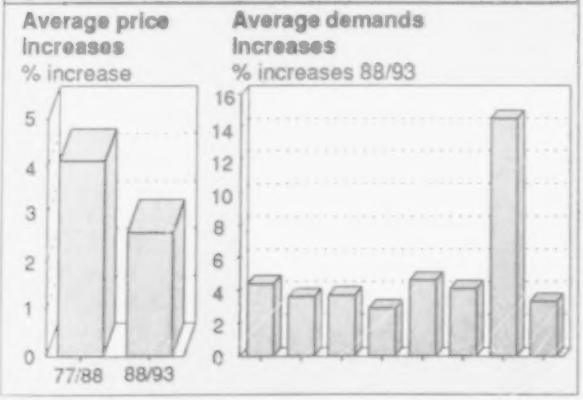
Looking back at demand, increases through 1993 are put at around 2.2% per year in real terms—and 4.9% in current-dollar terms. Best showing is anticipated for single-ply roofing (up 14.5% a year in current-dollar terms)—though supply constraints here should make for about 6% annual price hikes.

On the other hand, other mechanical rubber products will be mixed. Roll covering will face stiff competition from polyurethanes and ceramics, but will find opportunities in graphic arts. Opportunities in rubber fuel cells are based on growth in the aircraft retrofit market and problems encountered with integral tanks (a major competitor).

As for hose, only a 4.3% current-dollar growth rate is seen. Better-than-average gains are expected for the hydraulic market because of increased demand from industrial and construction sectors. Opportunities also exist in higher-performance products, and market niche filling.

The industrial belt and belting market, meantime, should increase 3.4% a year in current-dollar terms. Behind slow growth here: a combination of mature markets, severe foreign competition, and the lack of significant upturns in the farm, industrial, and mining sectors.

Industrial rubber product trends



Copper prices are dropping

Market prices have dropped close to the dollar-per-pound mark—far under the $1.30/lb.-plus quote prevailing as recently as this past fall. It is not likely to be the market floor, either. Increasing supplies both here and abroad are suggesting quotes as low as 85¢/lb. over the next year or so. Also indicative that the big run-up of the past few years is over: some producers have locked in their 1990-1991 production at just over a dollar per pound.

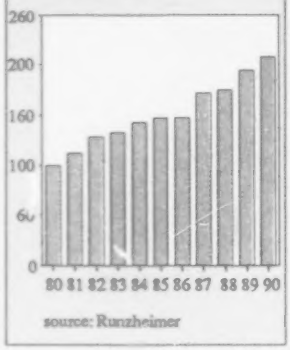
Titanium tags on the rise

Prices for alloy sheet, plate, and billet products are moving up 5% on deliveries through the third quarter. The new quote for 0.05 in. x 36 in. x 96 in. sheet (3,000 lb. quantity basis) goes from $25.31/lb. to $26.59/lb. Blame the advance on rising feedstock and manufacturing costs. Demand will be fairly brisk, too, with more than 54 million pounds of mill products expected to clear the market this year, *versus* 53 million pounds in 1989.

Travel fares fly high

Figure on the average trip costing about 7% more than it did in 1989. Airfares should rise the most (8%), followed by car rentals (7%), lodging and meals (6%). These costs have doubled over the past decade. The advance, however, is considerably under last years' big 11% spurt, when airlines tightened restrictions for travelers.

Business travel



Paper shows some softening

Price erosion in newsprint has temporarily subsided but not before some 7% was knocked off the price in 1989. And with 6.4% more capacity being added in North America this year, another 5 - 7% drop can't be ruled out by summer or fall. Linerboard is also becoming increasingly competitive, with spot discounts of $10 - 20/ton reported.

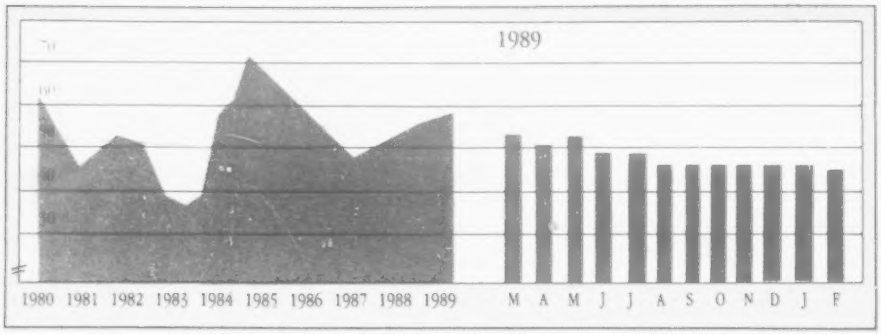
Zinc tags choke on low demand

Markets remain soft, with a combination of slower demand and rising availability holding quotes down in the low 70s. And further declines are possible. One big producer, for example, puts the average price for the year at only 64¢/lb.—well under the 75¢/lb.-plus level of 1989. Also calculated to keep prices under pressure: the build-up in producer and LME inventories that already seem to be underway.

BUSINESS DATATRAK

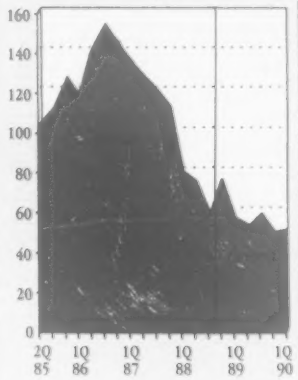
N.A.P.M. business barometer

Based on five indicators (employment, inventories, new orders, production, vendor performance)

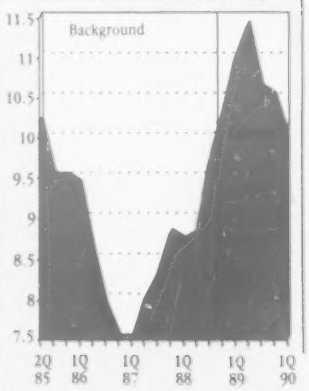


Leading indicators

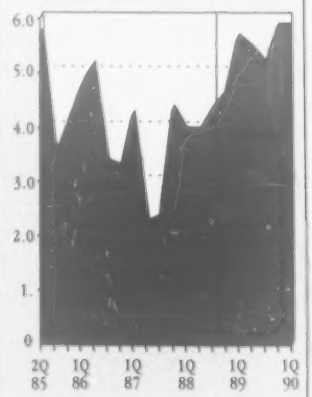
Net real imports



Prime interest rate %



Savings rate %



KEY ECONOMIC TRENDS

Taking the bad with the good

Discount talk of any imminent business downturn.

Current activity seems to be taking a breather—with real growth showing little more than fractional gains. This should be weighed against a number of economic pluses which, when combined, should be able to keep business on an upward trend in the near future.

One plus is a relatively strong employment picture. The economy is continuing to generate upwards of 200,000 new jobs a month. And the jobless rate is holding steady around the 5.3% level.

And if new "want-ad" figures are correct, this pattern is likely to continue. Thus despite slow growth, the widely monitored help-wanted index actually edged ahead during the latest reported month. The compiler of this series, the Conference Board, even feels that there could be a slight pickup in hirings over the next few months.

Employment, incidentally, is one of the three key props recently cited by Fed chairman Alan Greenspan. The other pluses noted: 1) lack of any upswing in inflation, and 2) relatively healthy export sales. The latter is confirmed by latest NAPM Business Survey Committee findings pointing to continued strength in orders from overseas buyers.

All this, in turn, suggests that the recent balance of trade improvement is not temporary. *PurchasingWorld* predictions indicate that real net imports (imports less exports in constant 1982 dollars) will hold at near the $50 billion seasonally adjusted annual rate level—half the deficit prevailing as recently as fourth quarter 1987 (see chart).

Slowly declining interest rates also have to be regarded as a favorable sign. The prime rate recently dropped back to 10%—1.5 percentage points under the year-earlier peak (see chart). And the Fed isn't about to opt for any major easing. Even the slight decline just noted should be enough to provide business with a small upward jog.

There's also little indication that consumers are pulling in their horns—while auto sales have disappointed, soft goods continue to inch ahead. In any case, consumer saving is holding steady at 5.8% of disposable income.

While higher than it's been in a long time (see chart), the figure only reflects a return to normalcy after the spending spree of the past few years. Auto

sales may even pick up this spring, as Detroit increases its financial incentives.

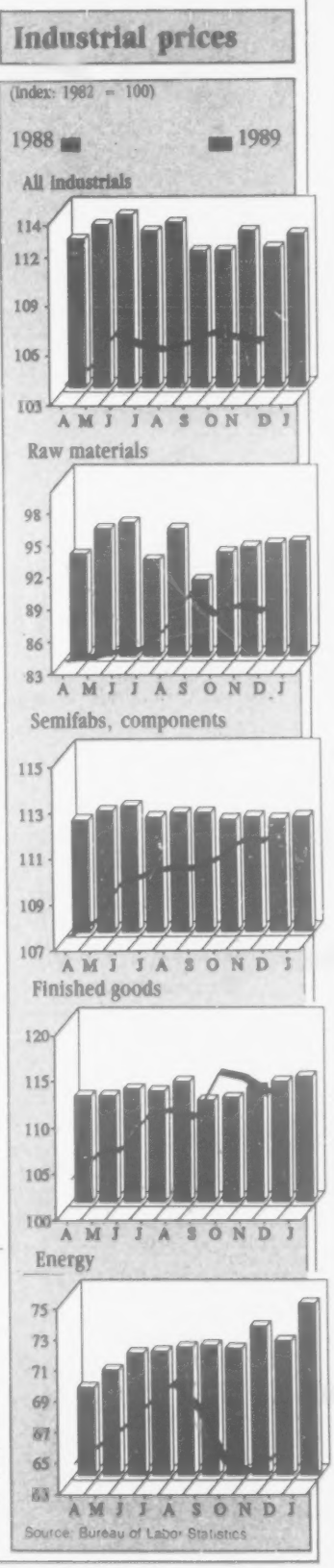
All this is not to imply that things look bright. Certainly the latest NAPM Business Barometer (chart above) continues soft. But even here things aren't all that bad. As NAPM's Bob Bretz puts it, "The index would have to fall below 44 before indicating a GNP decline—and that's still more than a point under the latest reading."

His appraisal is also backed up by the government's leading indicator index. It turned in its strongest performance in nearly a year at latest report, further bolstering the argument that a business downturn is just not in the cards.

And the Fed's Greenspan would seem to agree. In recent testimony before Congress, he called the current slowdown a "temporary hesitation," adding that the threat of recession has actually been diminishing of late.

He notes, for example, that past experience with Uncle Sam's leading indicator index suggests that odds of a recession are now in the low 20% range. And if you look at another predictive index (this one by the National Bureau of Economic Research), Greenspan says the probability of recession drops down to 10%.

In short, while things may not be all that good, they could be a lot worse.



CURRENT PRICES

Price index up slightly

Chalk up another month of fractional advances for the widely monitored industrial producer price index.

The overall increase for the month was only 0.1%—or just over one percent at annual rate. It suggests that year-to-year changes this spring and summer will be a lot less than the near 4% increase noted over the past 12 months.

Also on an upbeat note (at least as far as purchasing managers are concerned): of the 50 or so individual product lines monitored on a regular basis by *PurchasingWorld*, about 20 actually edged lower over the most recent period. A few (six to be exact) also sported negative year-to-year declines.

Plastic resins, plagued by oversupply and relatively poor demand, show the sharpest declines. But as suggested in the more detailed plastics analysis in the *PW Predicts* section of this issue, the biggest declines in this area have probably already occurred.

Energy tags, meanwhile, are mixed. Residual and heating oils, pressured by seasonal factors, are up, but gasoline has started to edge lower. More important is the expected weakness in most energy sectors by spring, as lower crude oil costs filter down to the refined products area.

Also somewhat on the soft side are paper and paper product items. Specifically, paper, paperboard, and corrugated all showed fractional declines over the past month. The drop in the latter, in part, reflects some of the discounting that has begun to crop up in this highly competitive area.

Similar softness is noted in most metal sectors. Copper, aluminum, and zinc have all continued to edge lower. A similar pattern is noted in steel—with the 0.2% decrease over the past month probably understating the case (Uncle Sam's price watchers often fail to pick up price shading in steel transactions).

Even the more highly fabricated machinery and equipment category seems to be taking a breather as far as prices are concerned, with a 0.2% increase recorded last month. In fact, some fractional declines are reported in tools and dies, transformers and power regulators, oil and gas field equipment, and motor trucks.

Moreover, moderation in this key sector is expected to continue. *PW* projects only a 2.5% increase for all of 1990 *versus* all of 1989—a considerable improvement over the 3.6% price increase on machinery and equipment during the past year.

Top execs get bullish

The nation's top business executives have turned more optimistic and see things leveling off after the deceleration of the past few quarters.

That's the good news from Dun & Bradstreet's latest quarterly survey of some 1,500 of the nation's business leaders. D & B's corporate economist, Joseph W. Duncan, feels this is consistent with a "soft landing" scenario. He adds that the U.S. economy is "regathering strength for the second half of 1990; prices have moderated, inventories are in line, and new orders are respectable."

The new numbers certainly seem to indicate this:

• **Prices**: Only 37% of queried manufacturing executives see first quarter 1990 prices topping those of a year ago. Last spring the comparable reading was up near 50%. All of the latest slippage here, says D & B, is centered in the nondurable goods sector.

• **Inventories**: The decline in those manufacturers reporting increases *vis a vis* a year ago has been fairly impressive—from 43% last spring to 32% currently. Certainly, there's little indication of the inventory buildup that usually precedes a business recession.

• **New orders**: The drop in those expecting increases (from 74% last spring to 62% now) hardly spells disaster. Point to keep in mind: the majority still see gains—with only 7% actually anticipating declines.

The D & B survey has also introduced something new this time around—a regional breakdown. It shows a mixed picture. Specifically, the New England states continue to report declines in sales optimism—replacing the oil patch as the region with the least optimistic outlook.

On a rosier note, Duncan notes expectations for sales gains this quarter in the west north central, east south central, and west south central regions.

Business trends: A top exec. view

% of respondents vs. years ago.

source : Dun and Bradstreet

PROCUREMENT STATUS REPORT

Indexes reflect ample supplies

Still no sweat on the industrial purchasing front. There are a few items on the tight side, but the list is small. It's also likely to get smaller as warmer weather knocks natural gas and propane off the hard-to-get list. The only persistent problems seem to be limited to bearings, bleached paperboard, sodium chlorate, titanium dioxide, and alkalies.

More purchasing managers reporting faster than slower deliveries is another sign of continuing ease. In any event, the National Association of Purchasing Management (NAPM) supplier delivery index, which measures the gap, remains under the neutral 50 mark, despite some winter weather problems.

Backing this up is *PW's* leadtime index which has been holding at or under the neutral 50 mark for well over a year now. Implication: more leads are coming in than stretching out.

These ample supplies are having an impact on inventory strategy. Faster deliveries are enabling buyers to pare their stocks, further forcing the NAPM inventory index to its lowest level in over four years.

Also reassuring is the fact that more PMs are reporting price decreases than price increases. This has been the case now for eight straight months. What better sign of a buyers' market?

PMs might also want to take note of just-revised seasonal adjustment factors for the above and other NAPM procurement yardsticks. New Commerce Department figures suggest that price increases tend to reach their peak in January and April, that supplier deliveries problems peak in March, and that inventory increases are most likely to occur in February.

Conversely, prices tend to rise least in November and December, supplier delivery slowdowns are least bothersome in June, and inventory increases are least likely to occur in November, when nearly 8% fewer than normal are usually adding to their holdings.

R & D spending marks rise

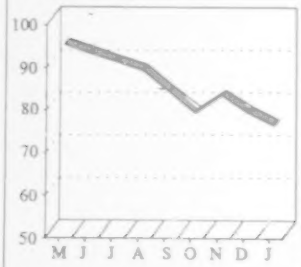
The 1990 research and development picture remains basically mixed.

On the plus side, overall spending in real terms should rise about 2.1% (4.8% in current-dollar terms, since prices are expected to rise 2.6%). But this still leaves a lot to be desired inasmuch as the average real advance over the past 10 years came to a somewhat more robust 3.1%.

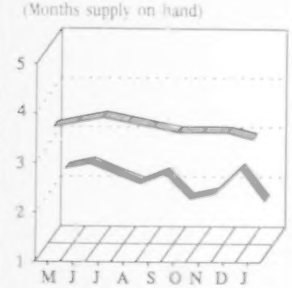
The new estimates from the Battelle Institute (Columbus, OH) also suggest major changes in emphasis—because of significant global shifts in both

Steel

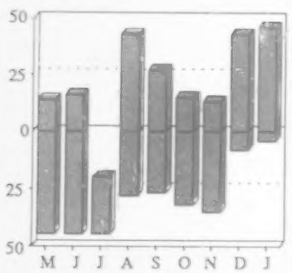
Operating rates



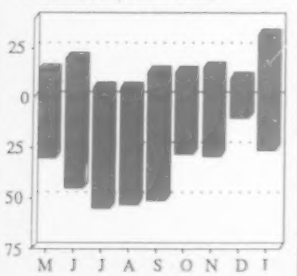
Inventories
(Months supply on hand)



Demand (STEEL SERVICE CENTERS)
(Percent of respondents)



Demand (STEEL BUYERS)



Source: Steel Service Center Institute
NAPM Steel Buyers Committee

the political and economic environment. Taking off on this, Battelle president Dr. Douglas Olesen observes, "We expect there will be continuing reallocation and reevaluation—changes that offer both challenges and opportunities."

The international technology firm points out, however, that industry continues to support short-term R&D projects and is reacting to the pressure from foreign technological competition. On the other hand, long-term development seems to be taking a back seat.

While this short-term emphasis could have an adverse impact, Battelle feels there are also positives, namely the big trade imbalance and continuing efforts to correct it.

As for the actual 1990 numbers, from a source of funds perspective, industry's share comes to almost 49%, with most of the remaining support coming from Uncle Sam (47%). Minor contributions are split between academia (3%) and nonprofit organizations (1%).

Also worth noting: over the past few years, industry and government have switched roles as the primary funding source. Government played the major role before 1980, but in most years since then, industrial support has been dominant...and that trend is expected to continue in 1990.

As for who will do the R&D work, industry should account for over $100 billion in current dollar terms (72% of the total). Aerospace, as might be expected, will chew up the biggest dollar sums (over $24 billion), followed by electric machinery ($16.2 billion), nonelectrical machinery ($15 billion), automotive ($10.9 billion), and chemicals ($10.8 billion).

STEEL SCENE

Rise expected in steel orders

The 6% decline in overall steel shipments projected by most analysts for 1990 could turn out to be too gloomy.

The really near-term outlook seems to be improving. Forty-six percent of steel service centers responding to the latest Steel Service Center Institute (SSCI) survey see an increase in incoming orders over the next three months—the highest reading in several years. The fact that only 4% anticipate declines further serves to emphasize their basically upbeat feeling.

This view is backed by SSCI president, Andrew G. Sharkey, who observes, "Other than automotive, a broad cross section of manufacturing remains healthy—and that bodes well for service centers in the current quarter."

Buyers have also raised their steel procurement sights, but not nearly as much as distributors. The latest NAPM Steel Buyer survey shows more PMs anticipating increases than decreases over the next three months. The difference between the contending groups, however, is narrow (32% voting for boosts *versus* 26% for a falloff).

Whatever the buying pattern, price softness should continue to be the order of the day. Some 52% of responding service centers feel metal replacement costs will drop over the next six months—with the overwhelming majority putting the decline in the 2-5% range. This figure is far above levels prevailing through all of last year.

Looking at the other side of the coin, only 4% anticipate paying more for their steel over this period. That compares to the high of 43% who anticipated increases as recently as last March.

Even import competition may be on the rise, with 22% of queried distributors saying overseas mills are offering prices 6-10% under comparable domestic levels—the biggest such figure since November 1988.

And they report the same kind of trend for stainless. As of latest report, one out of ten noted 6-10% price breaks for this specialty steel—far above the figures prevailing over recent years.

Buyers also confirm a slight rise in foreign competition. The 38% who now say foreign steel is slightly cheaper tops the year-earlier reading by close to a 3:1

Import prices
(compared to domestic)

Steel buyers
ABOVE 41%
SAME 21%
SLIGHTLY BELOW 38%
SUBSTANTIALLY BELOW 0%
SERVICE CENTERS (carbon)
ABOVE 4%
SAME 74%
5-10% BELOW 22%
10-20% BELOW 0%
OVER 20% BELOW 0%

margin.

Another favorable sign for steel buyers: ready availability—with 90% of those queried anticipating problem-free steel procurement into early summer. That's the highest such reading in years, with only coated sheet mentioned by more than one purchasing manager as a possible bottleneck area.

Also encouraging is a dip in steel user inventories to the equivalent of 1.75 months' supply, off close to a week from levels prevailing early last year. This is consistent with industry statistics which show a 2.5-million-ton drop in user stocks over the past 12 months.

Service center inventories, on the other hand, remain relatively unchanged in terms of months' supply over the same period. But according to SSCI's Sharkey, tonnages are in pretty good balance with shipping levels.

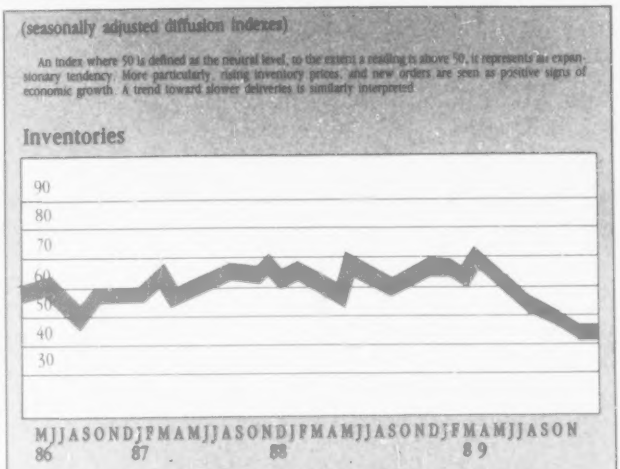
Latest spot market prices

	Latest price	Previous month	Year ago
FERROUS METALS			
Pig iron, basic, valley, gross ton	213.00	213.00	213.00
Pig iron, Bessemer, Pitts., gross ton	213.00	213.00	213.00
Steel, billets, Pitts., net ton	367.00	367.00	367.00
Steel, structural shapes, Pitts., cwt.	23.90	23.90	23.90
Steel, structural shapes, Chi., cwt.	23.90	23.90	23.90
Steel, structural shapes, Los Angeles, cwt.	23.90	23.90	23.90
Steel, bars, dlvd. Phila., cwt., merchant quality	18.70	18.70	16.50
Steel, bars, Pitts., cwt.	18.70	18.70	16.50
Steel, bars, C.R., Pitts., cwt.	23.95	23.95	19.45
Steel, plates, Pitts., cwt.	23.25	23.25	23.25
Steel, plates, H.R., Pitts., cwt.	23.25	23.25	23.25
Steel, sheets, C.R., Detroit, cwt.	30.65	29.65	29.65
Steel, strip, C.R., Chi., cwt.	36.18	36.18	36.18
Steel, basic wire, Pitts., cwt.	23.65	23.65	23.65
NONFERROUS METALS			
Aluminum, ingot, lb. (market place)	.650	.735	1.050
Antimony, N.Y., dealer, lb.	.89	.81	1.00
Beryllium-copper, cost ingot, lb.	5.90	5.90	5.90
Brass, red, 85%, [sheet], lb.	1.66	1.73	2.17
Brass, yellow, [sheet], lb.	1.62	1.69	2.09
Cadmium, N.Y., dealer, lb.	5.05	5.25	8.35
Copper, electrolytic, wire bars, refd., lb.	1.03	1.10	1.50
Copper sheet, over 24 in., lb.	1.75	1.82	2.22
Lead, common, N.Y., lb.	.40	.38	.37
Magnesium, pig ingot, [99.8%], lb.	1.63	1.63	1.63
Mercury, 20 fl. lots, N.Y., fl.	295.00	290.00	310.00
Molybdenum, oxide, dealer, lb.	2.65	2.54	3.48
Nickel, cathode, dealer, lb.	2.90	3.80	8.30
Platinum, dealer, oz.	512.00	495.00	530.00
Silver, N.Y., oz.	5.24	5.29	5.94
Tin, N.Y., dealer, lb.	2.95	3.22	3.50
Zinc, Prime West, East St. Louis, lb.	.65	.68	.87
Zinc, die casting alloy, No. 3, lb.	.73	.76	.90
PAPER			
Uncoated book #3 offset, ton	940.00	940.00	1020.00
Watermarked bond, ton	1090.00	1095.00	1080.00
Gummed sealing tape, carton	18.85	19.18	18.58
Grocery sacks, ton	495.00	495.00	460.00
Solid bleached paperboard, ton	835.00	835.00	730.00
Kraft linerboard, 42 lb., unbleached, ton	410.00	410.00	440.00
TEXTILES			
Burlap, 10 oz., 40", N.Y., yd.	.282	.282	.283
Cotton drill, 1.85, 59", 68x49, N.Y., yd.	1.24	1.24	1.18
Cotton middling, 1", N.Y., lb.	.624	.611	.529
Printcloth, 48", 80x80, N.Y., spot, yd.	.50	.50	.50
Army duck, 37", 13 oz., yd.	1.45	1.40	1.50
Blended printcloth, 64", 78x54, yd.	.72	.80	.70
20s combed yarns	1.85	1.94	1.80
Wool 64s, Staple, lb.	3.00	3.00	4.50

NAPM procurement trends

(seasonally adjusted diffusion indexes)

An index where 50 is defined as the neutral level, to the extent a reading is above 50, it represents an expansionary tendency. More particularly, rising inventory prices, and new orders are seen as positive signs of economic growth. A trend toward slower deliveries is similarly interpreted.

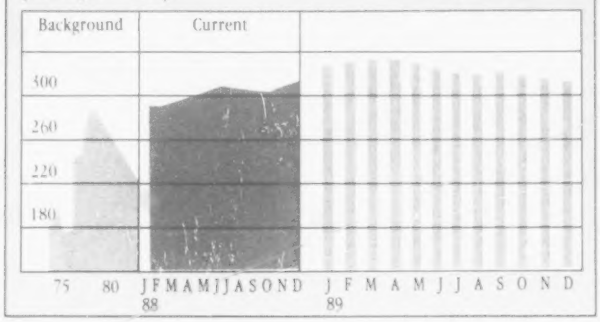


BUSINESS DATATRAK

Raw material price barometer

(Index 1967 = 100)

Last month 300.7
Month before 301.8
Year ago 324.7



This month's breakdown

Index: 1982 = 100	Latest level (Dec.)	% change from: Month ago	Year ago
Bearings	125.7	0	4.6
Bolts, nuts, etc.	114.8	0.3	6.2
Chemicals, inorganic	111.5	−0.5	5.6
Chemicals, organic	111.4	−0.1	−4.7
Concrete products	111.8	0.1	1.4
Corrugated cartons	112.5	−0.2	1.4
Cutting tools, small	112.5	0	3.7
Electric lamps (bulbs)	131.5	4.8	7.3
Electronic components	120.6	0.7	1.8
Fans and blowers	121.4	0.1	5.2
Foundry and forge products	115.1	−0.2	3.0
Fuel oil (residual)	52.0	5.7	30.0
Furniture, commercial	130.8	0.3	3.4
Gasoline	60.6	−2.4	9.2
Glass, flat	108.4	−0.4	−2.8
Glass containers	115.9	0	3.2
Gypsum products	109.0	−1.7	−4.3
Hand tools	129.5	0.2	4.6
Hand tools, power driven	117.7	0.1	2.8
Industrial furnaces	125.5	0.2	3.0
Integrating and measuring instruments	123.0	0.2	6.1
Internal combustion engines	116.3	−0.2	3.4
Lubricating oil	112.0	1.2	5.0
Lumber millwork	128.6	0.2	4.6
Material handling equipment	113.2	0	3.8
Metal containers	113.1	0.3	2.7
Metal mill shapes (nonferrous)	130.6	−2.8	−7.2
Metal tanks	111.5	−0.3	3.7
Motors and generators	130.6	0.5	5.1
Motor trucks	133.7	−0.3	2.7
Office and store equipment	110.5	0.3	1.7
Paperboard	139.6	−0.1	2.3
Paper boxes and shipping containers	131.3	0.1	3.6
Paper office supplies	121.7	0	2.0
Paint	121.4	0	5.9
Plastic resins	122.7	−3.7	12.4
Precision measuring tools	125.3	0	2.9
Pumps and compressors	116.3	0	4.4
Refractories	119.7	−0.3	3.7
Rubber belts and belting	116.3	−6.1	7.1
Scales and balances	107.7	0.3	0.9
Steel products	114.0	−0.2	1.5
Switchgear	120.4	0.6	4.9
Textiles, synthetic fibers	106.9	−0.4	7.0
Textiles, gray fabrics	117.5	0.9	2.2
Tires and tubes	97.2	0	2.0
Transformers and power regulators	118.4	−0.3	6.2
Welding equipment	123.6	−0.2	3.9
Wire and cable	142.4	−2.8	−4.0

	Latest price	Previous month	Year ago
CHEMICALS			
Acrylonitrile, tanks, lb.	.35	.42	.36
Ammonia, anhydrous, tankcars, Gulf Coast, ton	86.00	86.00	125.00
Benzene, petroleum, tanks, Houston, gal.	1.40	1.35	1.87
Caustic soda, 76% solid, drums, carlots, cwt.	28.00	28.00	28.00
Cresylic acid [over 25%], tanks, lb.	.55	.55	.55
Formaldehyde, USP, 37%, [12% to 15% meth.], tanks, lb.	.133	.106	.106
Glycerine, synthetic, tanks, lb.	.845	.845	.760
Methanol, syn., tanks, 4,000 gals., f.o.b. Gulf Coast plants	.42	.32	.60
Naphthalene, crude, tanks, lb.	.16	.16	.16
Phthalic anhydride, tanks, lb.	.33	.33	.41
Polyethylene resin, low density liner film grade (market place), lb.	.385	.360	.515
Polypropylene, homopolymer grade (market price), lb.	.365	.365	.475
Polystyrene, general purpose grade (market price), lb.	.465	.465	.590
Polyvinyl chloride, pipe grade (market price), lb.	.295	.305	.440
Soda ash, 58%, light carlots, cwt.	6.15	6.15	6.15
Styrene monomer, 99.6%, tanks, lb.	.365	.350	.500
Sulfur, crude, ex-terminal, Tampa, Fla., lt.	123.00	123.00	142.00
Sulfuric acid, 66%, commercial, tanks, ton	69.89	69.89	66.86
Titanium dioxide, anatase, reg., carlots lb.	1.02	1.02	.95
Xylene, Gulf Coast, spot, barge, gal.	1.05	.78	N.A.
BUILDING MATERIALS			
Lumber, 2x4 fir, mbf, cl.	336.28	336.56	326.33
Lumber 2x2 pine, mbf, cl.	332.58	330.68	311.06
Plywood, plyform, ¾", msf, cl.	627.37	617.27	547.39
Plywood, ⅜", msf, cl.	416.22	434.33	368.28
Cement, bulk, ton, tl.	62.20	62.56	63.48
Sand, ton, cl.	7.05	7.03	7.23
Ready-mix concrete, 3,000 psi/cu. yd.,	47.90	47.60	48.55
Crushed stone, 1½", ton, cl.	N.A.	N.A.	N.A.
Concrete blocks, sand/gravel, 8"x8"x16", per hundred	90.93	90.09	86.72
Reinforcing bars, whse base, per cwt.	22.02	22.08	20.85
Asphalt paving AC-20	106.95	104.22	106.20
Vitr. Clay Sewer Pipe, Prem Joint, 12", per ft, cl.	N.A.	N.A.	N.A.
Concrete sewer pipe, 24", prem. joint, per foot, cl.	17.90	17.90	17.92
FUELS			
Crude oil (W. Tex Int Cush), bbl.	22.30	23.40	17.50
Diesel (reseller rack, Chi), gal.	.5110	.9000	.4775
Fuel oil No. 2 (N.Y.), gal.	.5675	.9650	.5150
Fuel oil No. 2 (Gulf spot), gal.	.5570	.8160	.4665
Fuel oil No. 6 (N.Y.) contract cargo, bbl.	24.75	26.75	18.50
Gasoline (prem unlded NY), gal.	.6750	.7550	N.A.
Gasoline (reg unlded NY), gal.	.6050	.6735	.4825
Kerosene (reseller rack, Chi), gal.	.6210	.9550	.5575
Propane (Mt. Belvieu, Tex), gal.	.2750	.5500	.1950
SCRAP MATERIALS			
Steel, No. 1, hvy., dlvd., Pitts., ton	100.00	95.00	122.00
Steel, No. 1 hvy., dlvd., Chi., ton	104.00	104.00	119.00
Copper, No. 1, East, wholesale buy, dlvd., lb.	.915	1.000	1.12
Copper, No. 2, East, wholesale buy, dlvd., lb.	.820	.930	.995
Brass, red, East, wholesale buy, dlvd., lb.	.875	.960	1.080
Brass, yellow, East, wholesale buy, dlvd., lb.	.54	.57	.54
Alum., old sheet/cast, E., wholesale buy dlvd., lb.	.380	.425	.670
Alum., mixed clip., E., wholesale buy, dlvd., lb.	.450	.500	.760
Zinc, old, East, wholesale buy, dlvd., lb.	.30	.30	.24
Lead, clean solids, East, wholesale buy, dlvd., lb.	.23	.23	.27
Paper, No. 1 mixed, dlr., N.Y., ton	Nom.	Nom.	Nom.
Paper, old corrug. box, dlr., Chi., ton	Nom.	Nom.	Nom.
Paper, old corrug. box, dlr., N.Y., ton	Nom.	Nom.	Nom.
Old newspapers, Chi., ton	−20.00	−20.00	Nom.
Old white ledger, Chi., ton	75.00	75.00	75.00

[Sources: Metals Week, American Metal Market, Engineering News-Record (20-city averages), The Wall Street Journal, Journal of Commerce, Chemical Marketing Reporter.]

Price outlook:

Ten-year view is positive

Wharton Econometric Forecasting Associates (the WEFA Group) offers useful data in its new 10-year price and production forecasts.

Overall, the projections are quite positive (4.9% average annual industrial price increases and 2.6% average annual production gains). But such figures can be deceiving, inasmuch as the Bala Cynwyd, PA-based consulting firm, sees significant industry-by-industry variations.

Selected long-term inflation and growth rates (1989 - 1999)

	Average annual % change	
Industry	**Price**	**Demand**
Copper	3.4	0.6
Crude oil	8.7	– 2.6
Natural gas	7.6	– 1.1
Contract construction (residential)	4.5	3.0
Contract construction (non-residential)	4.2	3.3
Knitting mills	3.2	1.2
Floor covering mills	3.3	0.8
Broadwoven & other textiles	3.3	1.6
Pulp & paperboard	3.9	2.9
Paperboard container	4.0	2.2
Industrial chemicals	3.2	3.0
Paints	3.5	2.4
Fertilizers	2.1	1.3
Tires & tubes	3.6	0.3
Glass containers	4.7	2.3
Steel mill products	4.0	0.1
Nonferrous metals	3.2	2.5
Metal containers	3.9	2.6
Engines & turbines	4.6	2.4
Farm machinery	3.9	1.3
Construction, mining & material handling	4.6	1.5
Metalworking machinery	4.4	3.6
General industry machinery	3.9	2.7
Office & store machines	– 2.1	4.1
Electrical transmission & distribution equipment	4.0	2.7
Household appliances	3.5	1.4
Communication equipment	4.5	2.5
Electronic components	3.1	4.3
Motor vehicles	4.3	0.6
Aircraft	4.4	3.3
Railroad equipment	4.2	1.9
Scientific & engineering instruction	4.2	3.2
Photographic goods	4.4	3.6
Railroad transportation	4.8	2.3
Motor freight & warehousing	4.9	2.4
Water transportation	4.3	2.0
Air transportation	4.8	2.4
Electric utilities	5.8	2.0
Gas utilities	5.0	0.1
Medical services	6.2	5.3
Financial, insurance & real estate services	5.7	2.6
Business services	5.6	2.5

Source: The WEFA Group

• **Price:** Office and store machines are expected to drop by about 2% a year (see accompanying table). And increases in the metals area should be relatively modest: 3.2% for nonferrous metals and 4.0% for steel mill products.

Also on the relatively low side are projected price boosts for textile mill products (3.3%), paperboard containers (4.0%), industrial chemicals (3.2%), paints (3.5%), fertilizers (2.1%), metal containers (3.9%), and electronic components (3.1%).

On the other hand, most machinery products are expected to average out a little higher—generally in the 4-5% range. So are most transportation services. And there are a few areas where bigger-than-5% advances are seen—crude oil (8.8%), natural gas (7.6%), medical services (6.2%), electric utilities (5.8%), and business services (5.6%).

For those interested in some of the major government price indexes, the following estimated increases for the same 10-year period are given: GNP price deflator (4.4% a year), cost of living index (4.9%), and producer price index for all commodities (3.7%).

• **Demand:** Generally speaking, biggest average annual real gains should be centered in industries with big export potential or high-tech orientations. Those tied into the capital spending sector should also fare somewhat better than normal.

A few of the big average annual real growth rates anticipated over this 10-year period: electronic components (4.3%), office and stores machines (4.1%), metalworking machinery (3.6%), and photographic goods (3.6%). All of these, incidentally, are well above the already-noted all-industry 2.6% average advances contemplated over the same period.

PW

Slow demand will hold down transport costs

Freight costs are not expected to pose too much of a problem this year.

True, there have been some fair-sized increases in recent weeks—most notably in the trucking sector, where fuel-related pass-alongs and a 5.5% general hike have hit many shippers. But less-than-sensational demand could well water down those increases as the year wears on.

In any case, most freight buyers responding to a new nationwide *PurchasingWorld* survey are betting on a pretty good year as far as containing transportation costs is concerned. All in all, the average advance is put at around 3.5%.

That's not all that much above the 3.0% boost being projected by Wharton Econometrics (see additional transportation story in this issue). It's also not that much different than the 3.0% figure projected a year ago, when a similar question was posed to *PW* readers.

The basically steady trend is further substantiated by the fact that those looking for bigger-than-1989 increases are almost being offset by the number anticipating smaller ones. The actual figures: 32% accelerating gains; 27% decelerating gains, and the remaining 41% looking for about the same rate of advance as last year.

Also on the encouraging side: the considerable discounting that still seems to be going on. More than two out of three respondents, for example, still report paying less than posted rates—with the off-list deals most prevalent in the trucking area.

Sure, a few of those queried said discounts aren't quite as big as they were a year ago. But by and large, the deals being offered are still quite impressive—with the majority of respondents using trucks saying they are still able to get anywhere from 30-50% off official schedules.

Still another price rise inhibitor could be the relatively lackluster demand pattern seen by transportation buyers for the current year—something which they feel should help keep the competitive pressure on carriers. And most freight analysts would seem to agree—noting that if trucking discounts persisted in a good 1989, they are almost sure to be a factor in a not-so-good 1990.

Moreover, any truck weakness should also slow down any rail rate boosts. As of now, the railroads seem to be selective rather than across the board in announcing new hikes—and this could well continue through the year.

Also likely to brake rail rate hikes is the ICC's recent finding that several carriers are now "revenue adequate." Implication: railroads can no longer raise rates up to 4% without ICC review.

Even air carriers are likely to be impacted by slower demand gains. Other things being equal, a softer economy suggests more deferred deliveries—with shippers increasingly unwilling to pay premium prices for overnight delivery.

Subsiding fuel costs—after the late 1989 runup—could also remove the excuses for new hikes. As fuel moves back closer to 1989's levels (as now seems almost certain), some of the recent increases in truck and air tariffs may be increasingly questioned by shippers.

These same shippers, incidentally, continue to put more emphasis on contractual agreements in their efforts to keep costs down. More than two out of five, for example, told *PW* this was one of their 1990 goals—and if attained, it's a task that should further limit near-term rate hikes.

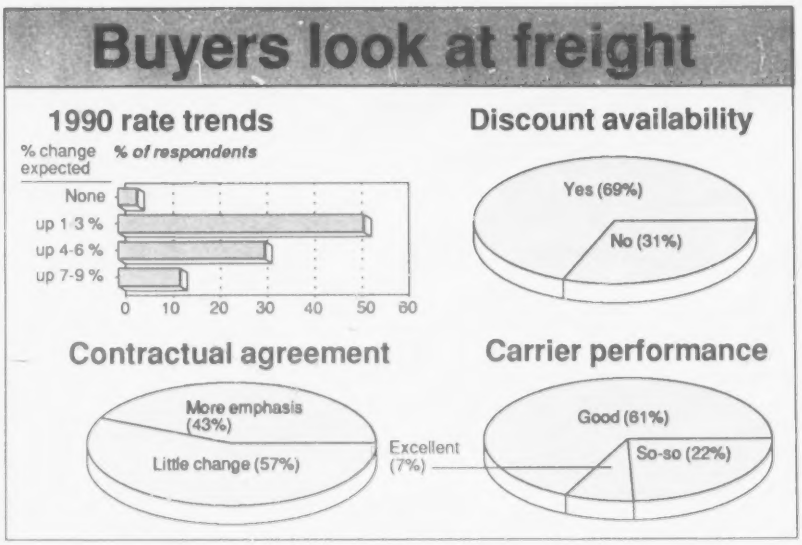
A fair number of respondents (17% to be exact) also utilize specialists (brokers, shipping associations, agents, etc.). The saving, they add, can sometimes run upwards of 15%.

On another rosy note: nearly four out of five rate carrier service as good or excellent. That's pretty much unchanged from last summer, when a similar question was posed by *PW* survey takers.

In any event, not one rates service as poor. As one buying executive put it, "There's plenty of competition around. As such, we can eliminate problem carriers almost immediately, with little or no impact on either incoming or outgoing orders."

PW

Buyers look at freight



Crystal Ball contest:

Making a business of forecasting

by Ron Stevens, managing editor

Our Crystal Ball contest was won this year by a purchasing specialist whose major job emphasis is as an economist—who's been closing in on the top spot for several years. When you make a business of forecasting, it has to pay off.

Eddie Meredith, Jr.—our 1989 winner—has been in his slot at General Dynamics Electric Boat Division (Groton, CT) for 17 years and, although he's not a member of the National Association of Purchasing Management, he's earned his stripes in the profession. Meredith said, when reached by telephone and told he'd won, that he was "shocked—I didn't expect it."

He shouldn't have been all that surprised, after all he'd placed fourth last year (third runnerup), and in the top 20 the year before.

Eddie Meredith, Jr.

What does Meredith use as sources? "I read a volume of stuff," he said, including *Business Week, PurchasingWorld, the Journal of Commerce, the Wall Street Journal, Metals Week,* and *American Metals Market.* He said he also follows the Bureau of Labor stats, and does all this on a monthly basis. It's his job to prepare commodity forecasts for his division, doing price and cost analysis.

Although the electric boat division has its own library, what Meredith reads comes to his office or *through* the library. He explains his methodology further, "I have strong leanings toward cause and effect relationships, sort of like a driver—you have to plan from what you see and make assumptions from that." He doesn't believe in using a lot of gut feeling for prediction purposes.

He factors in the fact that we have a Republican president with conservative leanings, somewhat counterbalanced by a Democratic Congress with liberal leanings. The *Wall Street Journal* is his source for political information.

It's important to realize, too, that Meredith's company builds submarines, and that materials are bought for his products 3-5 years ahead of time. "It's my duty to forecast this," he said, "and to keep track of strategic materials. I even read reports on mine activity."

Meredith also is looking for a third piece of good luck—his 10-year-old granddaughter recently won first place in the Cities of America finals in Orlando, FL; now he's won the Crystal Ball competition and, as he points out, "They say good things happen in threes!"

What gave our entrants trouble this year? Capital spending was a problem (it was last year, too). This year's number, 10.3% in current dollars, was just off from last year's 10.4%—and many of our entrants who have done well in years past were forecasting in the 6.5 range (which, by the way, is the current forecast for 1990)—our forecasters weren't expecting such a healthy number. It's possible that people underestimated American industries' resolve to progress, and it's possible that the entrants are not reading the *current dollar* stipulation. *PW* has decided to remedy that situation, and next year will change to constant dollars in this category, since the government has just started giving a deflated number here.

Possibly linked to this underestimation is the fact that factory operating rates were consistently *overestimated*. This suggests that purchasing pros figured industry would work existing plants harder rather than add new capacity. We feel that our contest results show that buyers are becoming increasingly more sophisticated in following prices, since in the first four categories (real GNP growth, GNP implicit price deflator, industrial producer price index and consumer price index) quite a few people hit the numbers in one or the other of these areas exactly. The other encouraging issue is that the same names are in the top 100 finishers each year. These forecasters, even if they're not right on target, are so consistently close that it's evident these people really know what they're doing.

Polaroid, for instance, had 22 of its people place in the top 100, a feat accomplished almost every year. That company obviously makes a business of forecasting: Warren Norquist, worldwide director of purchasing and materials for the Massachusetts-based company, has regular bi-weekly meetings for his staff, during which one member of the group updates the others on particular economic conditions and commodities the company buys. Polaroid's purchasing department was also featured in a *New York Times* article late last year.

The winning numbers:

Percent change, 1989 over 1988 (to nearest 0.1)	1986 actual	1987 actual	1988 actual	Your 1989 forecast
Real GNP growth—Commerce Dept.	2.5%	2.9%	3.8%	2.9%
GNP implicit price deflator—Commerce Dept.	2.7%	3.0%	3.4%	4.1%
Industrial producer price index—BLS (except farm products, food, feed)	– 3.6%	2.7%	3.5%	5.0%
Consumer price index—Bureau of Labor Statistics	1.9%	3.7%	4.1%	4.8%
Capital spending (current—dollars)—Commerce Dept.	– 1.7%	2.9%	10.4%	10.3%
Industrial production index—Federal Reserve Board	1.1%	3.8%	5.7%	3.3%
Factory operating rates—Federal Reserve Board (NOTE: Stated as arithmetic difference in rates, NOT as percent change.)	– 1.0	1.3	2.6	0.5%

PW's leading forecasters:

And here are the top finishers, with company affiliations and scores (deviation from the total):

Eddie Meredith, Jr., General Dynamics Electric Boat Div.—3.5
Robert Bretz, Pitney Bowes Inc.—3.8
Donald Shymanski, Reliance Electric—4.2
Michael Berry, GM Delco Products—4.3
Tom Hoffman, C.P.M., Regal Ware Inc.—4.4
James Maher, Jr., Hale Fire Pump Co.—4.4

Larry Martin, Sundstrand—4.5
Stephen Berry, Polaroid Corp.—4.7
Ned Diefenderfer, Computer Technology Corp.—4.8
Richard Cheri, Carpenter Technology—4.9
Walter Sesholtz, Hartz Mountain Corp.—4.9

Thomas Huey, SEG—5.0
Joseph Barmann, C.P.M., Society Corp.—5.3
Gurney Sampson, Lockheed Missiles + Space—5.3
Bill Fox, C.P.M., Argo Products—5.3
Keith Edwards, Argus International—5.4
P.Thomas Pfeffer, Browning Mfg. Div.—5.4
Paul Krafft, George Banta Co.—5.4

Sylvia Hill, GM Delco Prod.—5.5
Stathis Katsaros, The BOC Group—5.5
Richard Kroeger, GM Delco Prod.—5.6
J. Larden, Polaroid Corp.—5.6
Wayne Balsiger, Paccar—5.6

Lawrence Gibs, Polaroid Corp.—5.7
V. A. Taktajian, Shell Development Co.—5.8
Daniel Pilling, Magnavox Elect. Syst.—5.9
Philip Wheeler, Synergistics Inc.—5.9
James Brady, Polaroid Corp.—5.9

Larry Reaves, Bethlehem Steel—6.1
James Tomaswick, Polaroid Corp.—6.1
Jackie Jacoby, Microchip Technology—6.1
Melvin Miller, York Casket Co.—6.2
Gordon Lane, Shell Oil Co.—6.2
Daniel Murphy, Jr., Polaroid Corp.—6.2
Gordon Herman, Kent Community Hospital—6.2

M.L. Helmsmoortel, Polaroid Corp.—6.3
Randall Boitz, Turtle Wax—6.3
Eric Nicholls, NGK Metals Corp.—6.3
William Stimmell, Polaroid Corp.—6.3
Gene Kanter, Polaroid Corp.—6.3
C. Dale Magnuson, Reading Tube Corp.—6.3
Carl Dirkse, S.C. Johnson & Son—6.3

Larry Rudy, Polaroid Corp.—6.4
Fred Hunger, Elastimold—6.4
Jim Peplow, CMI Corp.—6.4
Walter Ekiert, M.J. Maguth & Son—6.4
L. R. Lewis, Jr., American Cyanamid—6.5
Penn Dixit, Automatic Data Proc.—6.5
Ted Fooskas, Davidson Fabricating—6.5

Peter Kendall, Allied Signal—6.6
Robert Merrill, Dielectrics Industries—6.6
Bryan Biechler, Black & Decker—6.7
Brian Thomas, Square D Co.—6.8
Frances Nerney, Edward Parkinson Co.—6.8
Samuel Coccia, Jr., Hubbell-Bell Inc.—6.8
Mark Groth, Philip Morris U.S.A.—6.8
Walter Byron, Polaroid Corp.—6.8
William Herro, SSI Technologies, Inc.—6.8

Luther Suber, Black &

Decker—6.9
Gordon Nicholson, Polaroid Corp.—6.9
E. Richard Rosenblatt, Polaroid Corp.—6.9
T.D. Hynds, Shell Development Co.—6.9
Don Ritucci, Polaroid Corp.—6.9

David Howard, Capital Prod. Co.—7.0
Joel Fleming, International Paper—7.0
Sarmento Silva, Hazen Paper—7.0
J.J. Marasia, Tennessee Eastman Co.—7.0
Richard Sawyer, Polaroid Corp.—7.0
G. Michael Gagnac, Jr., Polaroid Corp.—7.0
Albert Reddington, Polaroid Corp.—7.0
Janet Hillyer, Univ. of Alaska—7.0
Richard Fret, Ford Motor Co.—7.0

Richard Hoth, Ertl Co.—7.1
Tom Garrity, Baxter Edwards—7.1
Kent Moore, John Bishop Co.—7.1
Paul Boesiger, Ore-Ida Foods—7.1
Johnnie Couey, Northern Telecom—7.1
Phil Fowler, Southwestern Bell—7.1
Gary Edick, Fastener Services Inc.—7.1
Pat Bayers, AT&T—7.1
Eugene Johnson, Western Associates—7.1
John Hubbard, Polaroid Corp.—7.1
Ralph Benson, Bobst Group Inc.—7.1
James Loftus, Polaroid Corp.—7.1

Douglas Pepper, Lightolier—7.2
Carlos Peredo, General Motors—7.2
Mike Whiting, NAMIC—7.3
Ted Baker, American Design & Eng.—7.4
John Pakan, Schenectady Chemicals—7.4
Richard Hoyer, Polaroid Corp.—7.4

Leon Northcut, Cumberland Corp.—7.5
Joyce Anneken, American Red Cross—7.5
Gary Rogers, Vitarel Microelectronics—7.5
John May, McWane Cast Iron Pipe—7.5
Marc Poliferoni, Straubing & Rubin—7.5
Warren Norquist, Polaroid Corp.—7.5

Robert Kasabian, Polaroid Corp.—7.5

William Brittingham, Jr., Olin Hunt Prod.—7.6
J.M. Stephenson, M&T Chemicals Inc.—7.6
James Frazer, A.P. Green Ind.—7.6
C. Schmidlapp, Medtech Labs—7.6

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